

Appln. No. 09/920,192

Attorney Docket No. 10541-609

III. Remarks

Claims 22-27 are pending in the application. No claims have been cancelled.

Claims 21-27 have been amended. No new claims have been added.

Rejections Under 35 USC § 112

Claims 21-27 are rejected under 35 USC §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Applicants' claim amendments have corrected the indefiniteness kindly pointed out by the Examiner. Claims 21-27 are now in a condition for allowance.

Rejections Under 35 USC § 102

Claim 21 is rejected under 35 USC §102(a) as being anticipated by U.S. Patent No. 6,251,211 issued to Lake (Lake). Lake discloses a substrate having an electrically conductive polymer bumps. The polymer bumps are bonded with a conductive adhesive to circuitry supported by a second substrate.

As illustrated in Figure 1 of Lake, a first substrate is fabricated to support or define various circuitries. The electrically conductive polymer bumps are formed over bond pads of the circuitry. The polymer bumps are bonded with conductive adhesive to the circuitry supported by a second substrate. Prior to bonding an ultra violet radiation is applied to the polymer bumps which enhances adhesion of the bumps with the conductive adhesive and electrical conduction between the circuitry of the first substrate and the second substrate (column 2, lines 52-65).

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The present invention provides an electronic circuit assembly for connecting electronic components. The circuit assembly has an electrically insulated substrate, a tri-metal sheet having first and second layers of a first and second metal. The first layer includes at least two mounting pads and the second layer includes at least one metallic bump.

Lake does not disclose the use of a tri-metal sheet or at least one metallic bump attached to each of the at least two mounting pads. The bump disclosed in Lake is a polymer bump. Lake does not teach or suggest the use of metallic bumps attached to mounting pads, as claimed in claim 21. Therefore, claim 21 is patentable over Lake and allowance is respectfully requested.

Claims 21 and 25-27 are rejected under 35 USC §102(a) as being anticipated by U.S. Patent No. 5,615,477 issued to Sweitzer (Sweitzer).

Sweitzer discloses a printed circuit assembly and a method of manufacturing same for directly connecting unpackaged integrated circuit chips, such as flip chips to a footprint of active contact pads on a printed circuit substrate. Sweitzer's printed circuit substrate includes a number of active contact pads which are arranged in a footprint in a chip receiving area for providing electrical connections with the input and output connections of a flip chip or other unpackaged integrated circuit (column 6, lines 13-19). A typical unpackaged integrated circuit chip for use in the Sweitzer printed circuit assemblies is shown as flip chip 10. Flip chip 10 is generally formed of a silicon chip having passivation layers formed over the active side and back side thereof. Bonding pads are arranged in a grate array of the active side for providing input and output connections for the flip chip (column 6, lines 30-42). The flip chip also includes a number of solder bumps which are formed on the bonding pads

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**BRINKS
HOFFER
GILSON**BRINKS HOFER GILSON & LIONE
PO Box 10395

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during the manufacture of the flip chip (column 6, lines 65-67 and column 7, lines 1-2). The solder bumps are typically deposited on the bonding pads of the flip chip during manufacture of the chip. Typically the solder pads are formed of a tin lead composition having between three and ten percent by weight lead (column 7, lines 6-10).

In an embodiment of the present invention, as claimed in claims 21 and 25, an electronic circuit assembly is provided having at least one metallic bump attached to each of at least two mounting pads. The mounting pads are disposed on an electrically insulative substrate. The mounting pads and the metallic bump are made of a tri-metallic sheet. Sweitzer discloses a solder bump on a flip chip for interconnecting the flip chip to a circuit substrate. The solder bumps are not attached to the bonding pads of the substrate. They are attached to the flip chip and when placed in contact with the substrate and heat is applied, the solder bump liquefy and reflow (column 12, lines 8-16). The metallic bump of the present invention is not a solder bump it is made of a tri-metallic sheet and it does not reflow when heat is applied (see page 9, lines 8-32). Therefore, Sweitzer does not anticipate the present invention as claimed in claims 21 and 25. Allowance of these claims is respectfully requested.

Rejections Under 35 USC § 103

Claims 24 and 26 are rejected under 35 USC §103(a) as being unpatentable over Sweitzer in view of U.S. Patent No. 5,134,460 issued to S.J. Lins et al. (Lins). Lins discloses solder between a circuit and a substrate. Lins does not disclose a metallic bump. The metallic bump of the present invention is not solder, it is made of

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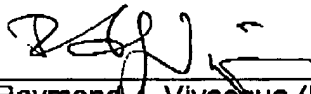
a tri-metallic sheet and it does not reflow when heat is applied (see page 9, lines 8-32). Therefore, Lins does not anticipate the present invention as claimed in claim 21 and 25. With regard to claims 24 and 26, these claims depend on claims 21 or 25 and therefore are patentable over Lins and Sweltzer taken together or separately for at least the same reasons as given above in support of claims 21 and 25. Allowance of these claims is respectfully requested.

SUMMARY

Pending Claims 22-27 as amended are patentable. Applicants respectfully request the Examiner grant early allowance of these claims. The Examiner is invited to contact the undersigned attorneys for the Applicants via telephone if such communication would expedite this application.

Respectfully submitted,

February 3, 2004
Date


Raymond J. Vivacqua (Reg. No. 45,369)
Attorney for Applicants